

Introduction to Botany. Lecture 9

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Outline

- 1 Questions and answers
- 2 Anatomy of root
- 3 Morphology of roots

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Previous final question: the answer

What is a pericycle?

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What is a pericycle?

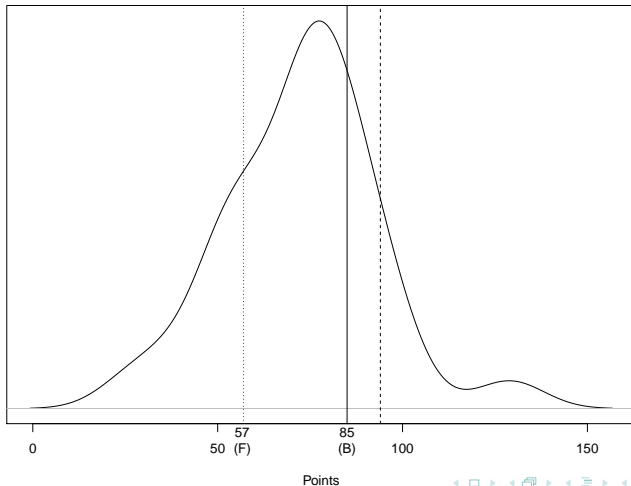
- Parenchymatic tissue originated from procambium
- Lays between vascular tissues and endoderm
- Initiates lateral roots and vascular cambium

Flood and trees: research credits available

Anyone interesting in doing directed research from the results of our Lab 2?

Results of Exam 1

Density estimation for Exam 1 (Biol 154)



Results of Exam 1 (statistic summary)

Summary:

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.	NA's
27.00	58.00	73.00	72.66	85.00	129.00	1.00

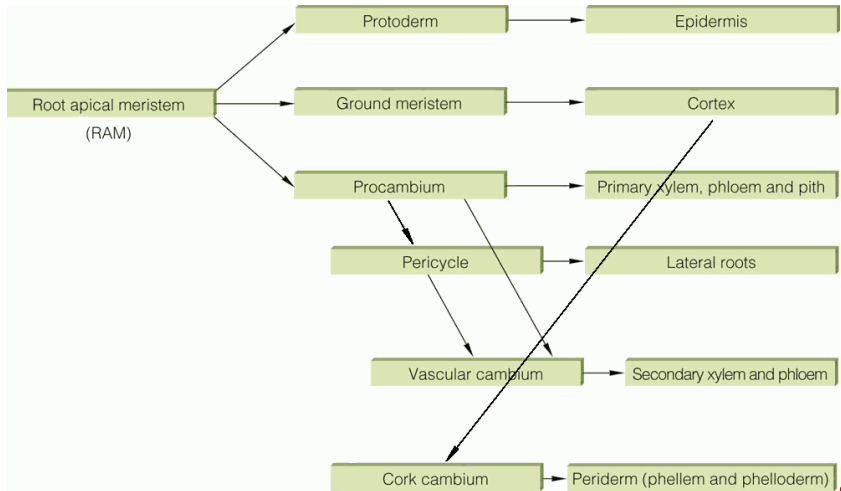
Grades:

F	D	C	B	max
57	66	76	85	94

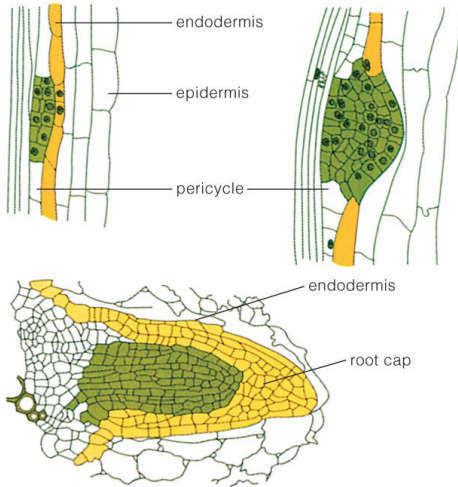
Discussion of exam questions

Bacterial cell (drawing)

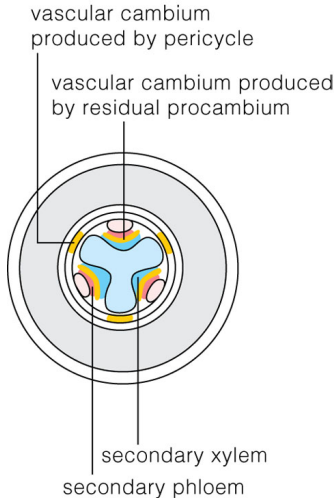
To repeat: origins of root tissues



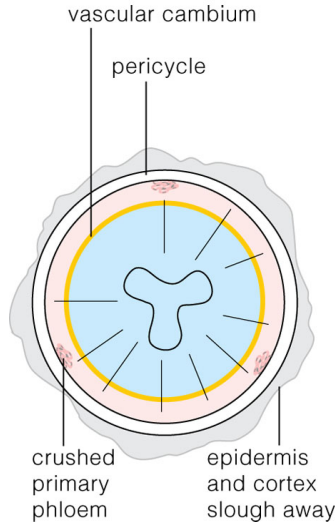
To repeat: origins of lateral roots



Root thickening

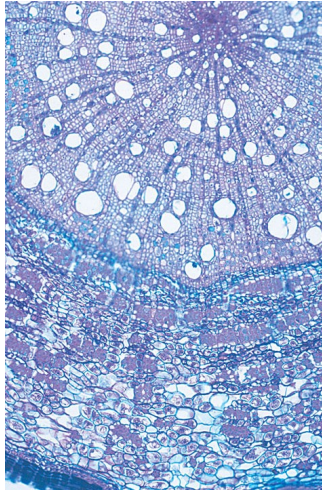


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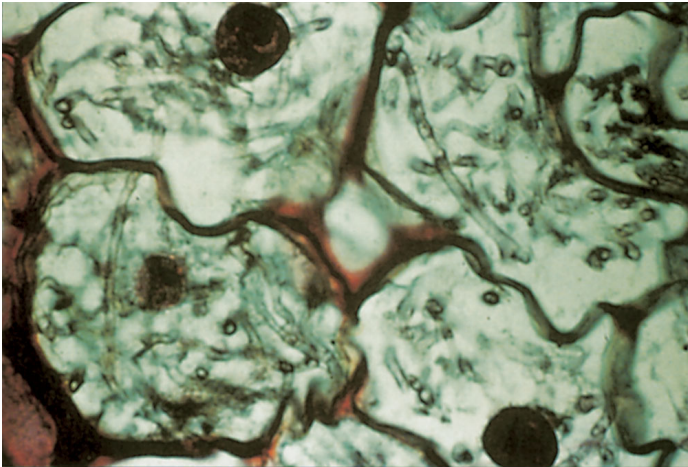
Secondary root (*Quercus* sp.)



Modifications of roots

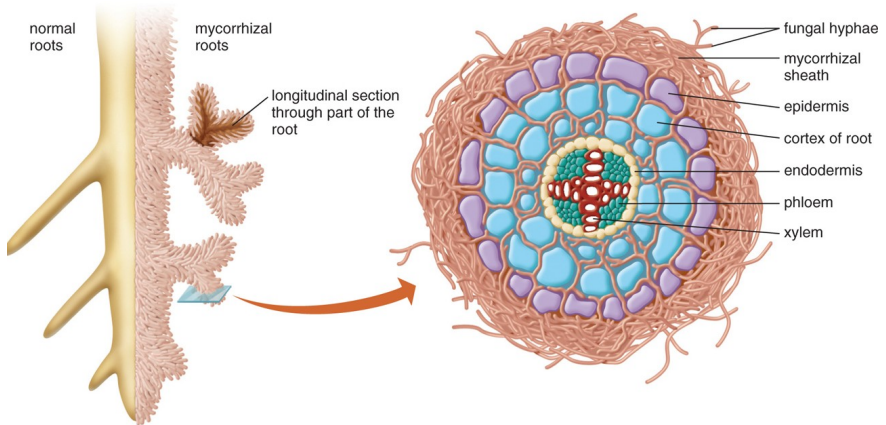
- Mycorrhizae: endotrophic (grasses, orchids) and ectotrophic (trees)
- Haustoria (parasites like *Cuscuta*—dodder plant)
- Root nodules (legumes, Fabaceae family)
- Contractile roots (*Hyacinthus* spp.—hyacinth, *Taraxacum* spp.—dandelion)
- Storage roots (*Daucus carota*—carrot, *Armoracia officinalis*—horseradish)
- Supportive roots (many tropical plants)

Endotrophic mycorrhizae in *Corallorhiza* orchid

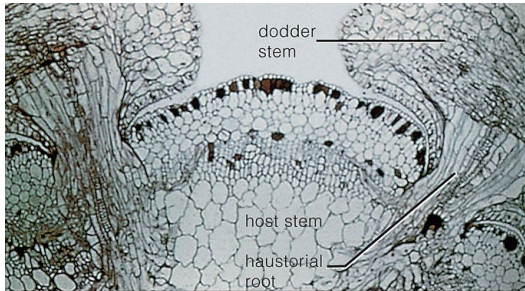


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Ectotrophic mycorrhizae of trees



Hauatoria of *Cuscuta* (dodder)



Nodulated roots of soybean (*Glycine max*)



Contractile roots of *Hyacinthus orientalis*



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Supportive roots of mangrove plants



Supportive roots of *Pandanus* sp.



Defensive spiny roots of ivy (*Hedera* sp.)



Photosynthetic aerial roots of orchids



Table of modifications

Function	Stem	Leaf	Root
Expansion	Adventive buds
Storage	Storage roots
Photosynthesis	...	DEFAULT	Some aerial roots
Defense	Root spines
Support	DEFAULT	...	Hauatoria, aerial and contractile roots
Interactions	Mycorrhizae, nodulated roots

Summary

- Root differs from stem having rhizoderm, thick cortex, endoderm, long-lived pericycle and radially arranged primary vascular tissues
- Secondary thickening make root more similar to stem
- Root modifications often provide ways of interaction with other organisms: bacteria, fungi and other plants

Final question (1 point)

Final question (1 point)

What are contractile roots?

For Further Reading



J. E. Bidlack, Sh. H. Jansky.
Stern's introductory plant biology. 12th edition.
McGraw-Hill, 2011.
Chapter 5.



Th. L. Rost, M. G. Barbour, C. R. Stocking, T. M. Murphy.
Plant Biology. 2nd edition.
Thomson Brooks/Cole, 2006.
Chapter 7.